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ABSTRACT

The purposes of this study were twofold: (1) to investigate the effect of movement for several inanimate objects on children's judgments of "aliveness;" and (2) to examine the nature of explanations given by three age groups of children in support of their judgments as to whether animate and inanimate objects were "alive" or "not alive." Inanimate objects were presented in both non-moving and moving states. Fifty-seven boys and girls (17 five-year-olds, 20 six- and seven-year-olds, and 20 eight- and nine-year-olds) were interviewed. The reasons or explanations children provided in support of their judgments were coded into five categories based on Piaget's stages of animistic thought: general movement, spontaneous movement, biological reasoning, vocalization, and miscellaneous. Results demonstrated that movement of inanimate objects increased animistic responding for all children. When inanimate objects were judged to be "alive," children provided explanations based on "general movement," while "biological" and "miscellaneous" categories of explanation were most frequently cited when objects were judged to be "not alive." The objects that possessed a motor elicited the highest frequency of animistic responses. "Alive" judgments for all objects decreased from the five- to six- to seven-year-olds, with no further decrease evident in the eight- to nine-year-olds. (Author/MP)

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The Effect of Object and Age on Children's
Judgment and Reasoning About "Aliveness"

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Piaget (1929) has suggested that children's attributions of life and consciousness to inanimate objects follow four stages due to their reliance on precausal reasoning strategies. Briefly these stages are described as follows: 1) consciousness and life are attributed to anything that is in anyway active, useful or has a function; 2) attribution of consciousness and life to anything that moves, with no differentiation made between spontaneous movement and movement imposed by an outside agent; 3) anything that moves of its own accord is conscious and alive; life being identified with spontaneous movement and 4) the child restricts consciousness and life to animals alone, or to plants and animals. Laurendau and Pinard (1962) systematically replicated Piaget's experiments using a sample of 500 children four through twelve years of age. They found a great deal of inconsistencies in the children's explanations of "aliveness." In one instance a child would rely on activity or usefulness (stage 1) and in another rely on undifferentiated movement (stage 2) to base his/her judgment of aliveness. Very few children were found to restrict themselves to the use of a single criterion of explanation for their judgments of "aliveness." Recent research (Margand, 1977; Smeets, 1974) has demonstrated that a child's judgment of "aliveness" for inanimate objects may not follow a predetermined developmental sequence, but instead that the attribution of life was highly dependent on perceptual object characteristics (e.g., movement, sound, familiarity) making "explanation" a more salient variable to focus upon than simply judgment of "aliveness."

In the present study the relationship between judgments of "aliveness" for animate and inanimate objects was examined in three age groups of children. The purposes of this study were twofold: 1) to investigate the effect of movement for several inanimate objects on children's judgments of "aliveness;" and 2) to examine the nature of explanations across the three age groups for animate and inanimate objects judged to be "alive" or "not alive."

Fifty-seven children (17 five year olds; 20 six and seven year olds; and 20 eight and nine year olds) were interviewed for the present study. Approximately an equal number of males and females were in each group. The children were from middle-income white families who resided in Lexington, Kentucky. The interview consisted of asking the children to judge if several animate (real bear, real baby, child's mother, the experimenter, the child him/herself) and inanimate (airplane, rock, stuffed bear, car, child's family car) were "alive" or "not alive." The children were also asked to explain their judgments. The four latter inanimate objects (rock, stuffed bear, car, child's family car) were presented in both non-moving and moving states. (The rock and stuffed bear were placed in front of the child during the interviews. The "car" was an unfamiliar car parked in a parking lot outside the testing room.) The reasons or explanations children provided in support of their judgments were coded into five categories based on Piaget's stages of animistic thought: 1) general movement (e.g., "it's alive because it moves," with no differentiation between spontaneous movement and movement imposed by an outside agent); 2) spontaneous movement (e.g., "it's alive because it moves by itself"); 3) biological reasoning (e.g., "it's alive because it breathes, sees, hears, eats,

thinks, etc.); 4) vocalization (e.g., "it's alive because it talks, cries, screams, etc.) and 5) miscellaneous (e.g., "by its' shape, just is, I don't know, etc.). Inter-rater reliability for the coding of this data was 89.02%.¹

Results

Role of Movement

Ten children judged one or more of the inanimate objects in the non-moving state to be "alive." These judgmental errors were across objects in the five and six to seven year olds, but confined to the rock in the eight to nine year old group. When some of the inanimate objects (rock, stuffed bear, car, family car and airplane) were presented in the moving state the frequency of "alive" responses increased. McNemar change tests revealed that a significant number of children (across all ages) changed at least one of their judgments of "not alive" to "alive" when objects were shifted from a stationary to moving state ($\chi^2_{(1)} = 19.36$, $p < .001$). This change was significant within the five year old age group ($\chi^2_{(1)} = 7.11$, $p < .01$); the six to seven year olds ($\chi^2_{(1)} = 4.17$, $p < .05$) and the eight to nine year olds ($\chi^2_{(1)} = 4.9$, $p < .05$).

The frequency of the "alive" responses for inanimate moving objects with a motor was greater than objects with no motor. This relationship was tested by creating two scores for each child, representing the number of objects with a motor (car, airplane) and without a motor (rock, stuffed bear) that were judged to be "alive." Each score ranged from zero to two. A 3 (age group) x 2 (type of object: motor/no motor) ANOVA revealed no significant age differences or two-way interaction. However, there was a significant effect for type of object ($F_{1, 54} = 18.83$, $p < .001$). Figure one illustrates these results.

Insert Figure 1 about here

Objects that possessed a motor were judged to be "alive" significantly more by all ages than objects that did not possess a motor.

The Effect of Object and Age on Judgment and Reasoning: Inanimate Objects

The frequency of usage of the categories of explanation was tabulated in relationship to judgments of "alive" and "not alive" made for each inanimate object (rock, stuffed bear, car, family car and airplane) in the moving state by age group. The categories of explanations were: 1) general movement; 2) spontaneous movement; 3) biological characteristics (which included vocalization in this analysis due to the low frequency of usage of this category for inanimate objects) and 4) miscellaneous reasoning. A 4 (explanation) x 2 (judgment: alive or not alive) x 5 (object) x 3 (age group) Multidimensional Chi-Square Contingency Analysis² revealed the tests of partial and marginal associations were both highly significant for the two-way interactions of explanation x judgment ($X^2_{(3)} = 52.80$, $p < .001$), explanation x age group ($X^2_{(6)} = 21.42$, $p < .001$) and judgment x object ($X^2_{(4)} = 26.28$, $p < .001$). An examination of the significant two-way interaction of explanation by judgment showed that children tended to use "general movement" the most frequently to explain why an inanimate object was judged "alive" in the moving state. However, when an inanimate moving object was judged "not alive" children most frequently used "miscellaneous" or "biological" reasoning, followed by the mention of "spontaneous movement" and lastly "general movement."

The significant explanation x age group interaction revealed that five and six to seven year olds tended to most frequently use "miscellaneous"

and "general movement" explanations. The eight to nine year olds most frequently explained that an object was "alive" or "not alive" by mentioning "spontaneous movement" and "miscellaneous" reasoning. There was an increase in the frequency of children, with increasing age, who mentioned "spontaneous movement." "Biological" reasoning was more evident in the two older age groups when compared to the five year olds.

The significant judgment x object interaction showed that children in all age groups most frequently judged inanimate objects in the moving state to be "not alive." However, the greatest frequency of animistic responses occurred with objects that possessed a motor (car, family car, airplane). Only 14 children judged the rock to be alive and nine children judged the stuffed bear to be alive in the moving state.

Animate Objects

All animate objects (real baby, child's mother, experimenter, the child him/herself, real bear) were judged to be alive, therefore eliminating the independent variable of "judgment" from the following analyses to be described. Explanations provided in support of children's judgments were coded in the same manner previously described for the inanimate objects with the exception that "vocalization" was used as a separate category and not collapsed into the "biological" reasoning category. A 5 (explanation) x 5 (object) x 3 (age group) Multi-Dimensional Chi-Square Contingency Analysis showed only the two-way interaction of explanation x age group was significant ($\chi^2_{(8)} = 32.10, p < .001$). This interaction revealed that children six through nine exhibited a significantly greater frequency of "general movement" and "vocalization" explanations in support of their judgments of "aliveness" when compared to the five year olds. "Spontaneous movement" reasoning showed no age differences, and was

infrequently mentioned by all children. "Biological" reasoning, however, increased with age. "Miscellaneous" reasoning was very high in the five year olds, but rarely was employed by the six to nine year olds.

Discussion

The results of the present study demonstrated that movement of inanimate objects increased animistic responding for all children. Animistic responses were more frequent for objects that possessed a motor for all ages of children. However, animistic responses did not show any significant age differences, nor age by object (motor/no motor) interactions.

When inanimate objects were judged to be "alive" children provided explanations based on "general movement" (no differentiation made between spontaneous movement and movement imposed by an outside agent), while "biological" and "miscellaneous" categories of explanation were most frequently cited when objects were judged to be "not alive." The objects that possessed a motor (car, family car, and airplane) elicited the highest frequency of animistic responses. "Alive" judgments for all objects decreased from the five to six to seven year olds, with no further decrease evident in the eight to nine year olds. Support for Piagetian Theory was evidence in that with increasing age explanations of "spontaneous movement" and "biological reasoning" increased, along with a decrease in "general movement" reasoning in the eight to nine year olds.

The significant interaction of explanation by age for animate objects lends further support for Piagetian Theory in that there was an increased usage of "biological" explanations with increasing age. However, increased "general movement" reasoning with increasing age was contrary to prediction. High frequencies of "vocalization" explanations in the six to seven and

eight to nine year olds points out the saliency of perceptual object characteristics in children's explanations of "aliveness."

In conclusion, the present data lend conditional support for Piaget's (1929) initial theorization of the progressive transitions in animistic reasoning. However, animistic reasoning did not exhibit a distinct age-by-stage delineation. Judgments of "aliveness" significantly increased within each of the three age groups when several inanimate objects, initially presented in a stationary state, were moved, supporting Klingberg (1957) and Klingensmith's (1953) findings. A progressive increase in "not alive" judgments of inanimate objects (presented in the moving state) was found, though, with increasing age, particularly for objects that did not possess a motor.

Children of all ages were significantly effected by the type of object presented to them in their judgments of "aliveness." Specifically, more animistic judgments were made for the car, family car and airplane in comparison to the rock and stuffed bear. No child judged any animate object to be "not alive." It may be concluded that children's conceptions of "aliveness" deviated from an "adult level" of understanding when inanimate objects were being judged and only judgment (not explanation) was focused upon. Therefore the specific object and the state an object was presented in influenced all children's judgments of "aliveness."

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Footnotes

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²For a complete discussion of the use of Multi-dimensional Chi-Square Contingency analysis refer to:

Brown, M. B. Screening effects in multidimensional contingency tables.

Applied Statistics, 1976, 25, 37-46.

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Figure 1

Mean number of alive responses as a function of age and type of object
(motor vs. non-motor).

